

Claims

1. (Currently amended) A photoacoustic spectroscopy sample array vessel comprising:
a vessel body having at least two sample cells connected to the vessel body, the sample cells having spaces therebetween;
at least one acoustic detector capable of receiving an acoustic signal from at least one sample cell; and
a material formed within the spaces, the material capable of enhancing transmission of the acoustic signal from the at least one sample cell to the at least one detector, the material comprising epoxy or a silicone-based material.

Claims 2-3 (Canceled)

4. (Currently amended) A photoacoustic spectroscopy sample array vessel comprising:
a vessel body having at least two sample cells connected to the vessel body, the sample cells having spaces therebetween;
at least one acoustic detector capable of receiving an acoustic signal from at least one sample cell;
a material formed within the spaces, the material capable of enhancing transmission of the acoustic signal from the at least one sample cell to the at least one detector, the material comprising epoxy or a silicone-based material; and

~~The sample array vessel of claim 1 further comprising~~ at least one acoustic fin connected to at least one sample cell and the at least one acoustic detector such that an acoustic signal from the at least one sample cell can travel through the at least one acoustic fin to the at least one acoustic detector.

5. (Original) The sample array vessel of claim 4, wherein the at least one acoustic fin functions as the material formed within the spaces.

6. (Original) The sample array vessel of claim 1, wherein the at least one acoustic detector is affixed to the body.

7. (Original) The sample array vessel of claim 4, wherein the acoustic fin is formed of a material selected from the group consisting essentially of polystyrene, polyethylene, polypropylene, plastics with mineral fillers, plastics with metallic fillers, laminated carbon materials, metallic materials, and mixtures thereof.

8. (Canceled)

9. (Original) A sample vessel for PAS analysis comprising:
a body having multiple sample cells for holding samples for PAS analysis;
at least one acoustic detector positioned to detect acoustic signals that emanate from a sample in a sample cell; and
at least one acoustic fin acoustically connecting at least one sample cell to the at least one acoustic detector such that the acoustic signals are directed to the at least one acoustic detector through the at least one acoustic fin.

10. (Original) The sample array vessel of claim 9 further comprising at least one acoustic fin connected to each of the multiple sample cells and to the at least one acoustic detector.

11. (Original) The sample array vessel of claim 10 further including a separate acoustic fin connected to a respective sample cell.

12. (Original) The sample array vessel of claim 11, further including a collection bar to which the at least one acoustic fin is connected and to which the at least one acoustic detector is connectable.

13. (Original) A PAS sample array vessel comprising:
a body having sample cells for retaining samples, the sample cells having side walls and being arranged in an n, m matrix with rows of sample cells;

at least one acoustic detector positioned to receive acoustic signals from a sample in at least one sample cell; and

an acoustic fin extending along a row of sample cells such that the acoustic fin makes physical contact with the side walls of the sample cells in the row, the acoustic fin connectable to the at least one acoustic detector.

14. (Original) The sample array vessel of claim 13, further including separate acoustic fins extending along each row of sample cells such that the acoustic fins make physical contact with the side walls of the sample cells in respective rows, the acoustic fins connectable to the at least one acoustic detector.

15. (Original) The sample array vessel of claim 13, further including a collection bar to which the acoustic fin is connected, wherein the collection bar is connectable to the at least one acoustic detector such that acoustic signals may be directed from the acoustic fins to the collection bar.

16. (Original) The sample array vessel of claim 13, further including an acoustic collector lens to which the acoustic fin is connected, wherein the acoustic collector lens is connectable to the at least one acoustic detector such that acoustic signals may be directed from the acoustic fins to the acoustic collector lens.

17. (Original) A PAS sample array vessel comprising:
a body having sample cells for retaining samples;
at least one acoustic detector positioned to receive acoustic signals from a sample in at least one sample cell; and
means for directing acoustic signals from each of the sample cells to the at least one acoustic detector and for minimizing reflection of the acoustic signals.

18. (Original) A PAS sample array vessel comprising:
a body having multiple sample cells for retaining samples to be analyzed by PAS;
at least one acoustic detector centrally positioned on the body within a group of sample cells, to receive acoustic signals from a sample in at least one sample cell in the group; and
an acoustic fin having a first end connected to a sample cell and a second end connected to the at least one acoustic detector such that acoustic signals from the sample in the sample cell are directed to the acoustic detector through the acoustic fin.

19. (Original) The sample array vessel of claim 18, further including multiple acoustic detectors each centrally positioned on the body within a group of sample cells, to receive acoustic signals from samples in each sample cell in a respective group of sample cells.

20. (Original) The sample array vessel of claim 19, further including separate acoustic fins extending from each sample cell in a group to a respective acoustic detector centrally positioned on the body within the respective group.

21. (Original) The sample array vessel of claim 18, wherein the sample cells have spaces therebetween, the spaces having acoustic material formed therein, the acoustic material enhancing the acoustic transmissivity of the sample array vessel.

22. (Original) A PAS sample array vessel comprising:
a body having multiple sample cells for retaining samples;
at least one acoustic fin having a first end connected to a sample cell and a second end connected to a collector bar; and.

at least one acoustic detector connectable to the collector bar to receive acoustic waves therefrom, the acoustic waves generated by a sample in at least one sample cell, the acoustic waves traveling through the at least one acoustic fin to the collector bar.

23. (Original) The sample array vessel of claim 22, wherein the collector bar includes a tapered end connectable to the at least one acoustic detector, the tapered end to focus acoustic waves received by the collector bar to the at least one acoustic detector.

24. (Original) The sample array vessel of claim 22, wherein the second end of the at least one acoustic fin includes a tapered end connected to the collector bar.

25. (Original) The sample array vessel of claim 22, wherein the first end of the at least one acoustic fin includes a tapered end connected to the ample cell.

26. (Original) A PAS sample array vessel comprising:
a body having multiple sample cells for retaining samples;
at least one acoustic fin having a first end connected to a sample cell and a second end connected to an acoustic collector lens; and

at least one acoustic detector connected to the acoustic collector lens to receive acoustic waves therefrom, the acoustic waves generated by a sample in at least one sample cell, the acoustic waves traveling through the at least one acoustic fin to the acoustic collector lens.

27. (Original) A photoacoustic spectroscopy sample array vessel comprising:
a vessel body having multiple sample cells connected to the vessel body;
a reflection collector bar formed by the vessel body, the reflection collector bar positioned to receive acoustic waves generated by at least one sample in at least one of the multiple sample cells; and

at least one acoustic detector connectable to the reflection collector bar, the acoustic detector capable of receiving the acoustic waves from the reflection collector bar.

28. (Original) The sample array vessel of claim 27, further comprising an acoustic material formed in spaces between sample cells, the acoustic material enhancing the acoustic transmissivity of the sample array vessel.

29. (Original) The sample array vessel of claim 27, wherein the reflection collector bar includes a divot formed therein to reduce reflection of acoustic waves in the reflection collector bar and to direct the acoustic waves to the at least one acoustic detector.

Claims 30-37 (Canceled)

38. (Original) A PAS sample array vessel comprising:
a body having multiple sample cells for retaining samples to be analyzed by PAS; and
at least one post collector centrally positioned on the body within a group of sample cells
to receive acoustic waves from a sample in at least one sample cell, the at least one post collector
capable of receiving an acoustic detector.

39. (Original) The sample array vessel of claim 38, further comprising at least one
acoustic fin having a first end connected to a sample cell and a second end connected to the post
collector such that acoustic signals from the sample in the sample cell are directed to the post
collector through the acoustic fin.

40. (Original) The sample array vessel of claim 38, wherein the sample cells have
spaces therebetween and further comprising an acoustic material formed in spaces between
sample cells, the acoustic material enhancing the acoustic transmissivity of the sample array
vessel.

41. (Original) The sample array vessel of claim 38, wherein the post collector further
includes an acoustic detector attached thereto.

42. (Original) The sample array vessel of claim 38, wherein the detector is attached
using a flexible support to maintain physical contact between the at least one acoustic detector
and the multiple sample cells.

Claims 43-46 (Canceled)

47. (Original) A sample array vessel for PAS analysis comprising:
a body having multiple sample cells for holding samples for PAS analysis; and
a reflective plate positioned beneath the sample cells, wherein the reflective plate is
transmissive to acoustic waves and reflects light such that the reflective plate is capable of

reflecting a light beam directed into a sample away from an acoustic detector without significantly impeding transfer of an acoustic signal emanating from the sample to the acoustic detector.

48. (Original) The sample array vessel of claim 47, wherein the reflective plate includes an upper surface and a lower surface, and an acoustic detector is positioned beneath the lower surface of the reflective plate.

49. (Previously presented) A sample array vessel for PAS analysis comprising:
a body having multiple sample cells for holding samples for PAS analysis;
a transducer positioned at each sample cell to detect acoustic signals that emanate from a sample in a sample cell when exposed to an excitation source; and
a reflective plate positioned near the body to reflect a light beam directed into a sample away from a transducer, without significantly impeding transfer of an acoustic signal emanating from the sample to the transducer.

50. (Original) The sample array vessel of claim 49, wherein the reflective plate is positioned beneath the multiple sample cells and above the transducers positioned at each sample cell.

51. (Canceled)

52. (Original) A PAS sample array vessel comprising:
a body having an array of sample wells for retaining samples therein;
a reflective plate connectable to a lower portion of the sample wells, wherein the reflective plate is transmissive to acoustic waves and reflects light;
a base plate having an array of acoustic detectors connected thereto, wherein the base plate is positionable below the array of sample wells such that the array of acoustic detectors align with a respective sample well in the array of sample wells.

53. (Original) The sample array vessel of claim 52, wherein the reflective plate is connected to the base plate.

Claims 54-63 (Canceled)